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A survey of desalinated permeate post-treatment practices

Steven J. Duranceau*, Rebecca J. Wilder, Susaye S. Douglas

Department of Civil, Environmental and Construction Engineering, University of Central Florida, Orlando, FL 32816-2450, USA
Email: Steven.Duranceau@ucf.edu

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ABSTRACT

As part of the Water Research Foundation (Denver, CO) project "Post-Treatment Stabilization of Desalinated Water," a questionnaire was developed and distributed to water utilities employing desalination processes to survey post-treatment practices, compile process and water quality data, highlight operating cost and post-treatment operation experiences, and identify distribution system secondary impacts. A total of eighty-three surveys were distributed to water utilities in the United States (USA), Caribbean and Europe, and responses collected over a period of six months duration from the time of initial mailing. Twenty-five questionnaires were returned yielding a thirty percent response rate. Twenty-one of the twenty-five responses were received from the USA, three from Europe and one response was received from the Caribbean. The average-daily permeate flow of the facilities surveyed ranged from 0.39 m^3/min (0.15 million gallons per day (MGD)) to 184 m^3/min (70 MGD). Results indicated a variety of methods are employed when post-treating desalinated permeate, with a majority of the surveyed facilities reporting the use of chemical addition using caustic soda (sodium hydroxide) or soda ash (sodium carbonate) for pH adjustment. More than one form of post-treatment was implemented with or without the need for by-pass or native source water blending, and was dependent on source water type. Facilities that relied upon process by-pass for post-treatment stabilization reported blending ratios between 10 and 30%, with an average blending flow rate between 5.26 m^3/min (2.0 MGD) and 27.6 m^3/min (10.5 MGD). Blended water alkalinity averaged 150 mg/l as $CaCO_3$, as compared to post-treatment with alkalinity adjustment that approximated 62 mg/l as $CaCO_3$ at the point-of-entry (POE). Primary disinfection was typically accomplished by chlorine addition, although a number of facilities reported using chloramines for secondary disinfection. The reported pH averaged 8.2 units at the POE.

Keywords: Survey; Desalination; Synthetic membrane processes; Post-treatment; Seawater; Brackish water; Disinfection; Degasification; Stabilization

*Corresponding author.